

IN THE CLAIMS:

- 1 1. (Original) A conformable fuel cell, comprising:
 - 2 (A) a membrane electrolyte intimately interfacing with a catalyst layer
 - 3 along each of the membrane's major surfaces being a catalyzed membrane electro-
 - 4 lyte, having an anode aspect and a cathode aspect, and which catalyzed membrane
 - 5 electrolyte is conformable to a desired shape;
 - 6 (B) diffusion layers sandwiching said catalyzed membrane electrolyte,
 - 7 said diffusion layers being comprised of materials that are conformable;
 - 8 (C) flexible current collectors coupled with each of said anode aspect
 - 9 and said cathode aspect of said membrane electrolyte;
 - 10 (D) fuel delivery means coupled with said anode aspect of said mem-
 - 11 brane electrolyte that delivers fuel substantially uniformly to said anode aspect
 - 12 while said fuel cell maintains said desired shape;
 - 13 (E) electrical coupling disposed across said anode aspect and said
 - 14 cathode aspect and having means for connection to an application device being
 - 15 powered by said fuel cell.
- 1 2. (Original) The conformable fuel cell as defined in claim 1 wherein said current
- 2 collectors at each of said anode aspect and said cathode aspect apply adequate compres-
- 3 sion effectively over the active area of the membrane electrolyte.
- 1 3. (Original) The conformable fuel cell as defined in claim 2 wherein said compres-
- 2 sion applied to said active area is equal to or greater than about 100 psi.
- 1 4. (Original) The conformable fuel cell as defined in claim 1 further comprising ef-
- 2 fective water management from cathode to anode such that water management is
- 3 achieved within the fuel cell.

1 5. (Original) The conformable fuel cell as defined in claim 1 wherein said fuel is
2 substantially comprised of at least one of the following: a vapor fuel, a gel fuel, a liquid
3 fuel and combinations thereof.

1 6. (Original) The conformable fuel cell as defined in claim 1 further comprising a
2 dedicated layer of material that substantially expands, thus imparting compression, upon
3 at least one of the following: hydration, exposure to fuel, and exposure to heat.

1 7. (Withdrawn) A conformable fuel cell system, comprising:

2 (A) a membrane electrode assembly, including:

3 (i) a membrane electrolyte intimately interfacing with a cata-
4 lyst layer along each of the membrane's major surfaces being a catalyzed
5 membrane electrode, having an anode aspect and a cathode aspect, and
6 which catalyzed membrane electrolyte is conformable to a desired shape;

1 (ii) diffusion layers sandwiching said catalyzed membrane
2 electrolyte, said diffusion layers being comprised of materials that are con-
3 formable;

4 (B) fuel cell housing including a molded plastic frame that has been
5 formed according to said desired shape that corresponds with a pre-selected body
6 appendage or shape, whereby said fuel cell is thus conformable to said appendage
7 or shape;

8 (C) current collectors at each of said anode aspect and said cathode as-
9 pect and said current collectors being edge-clamped by said frame to apply com-
10 pression effectively over the active area of the membrane electrolyte;

11 (D) fuel delivery means coupled with said anode aspect of said mem-
12 brane electrolyte that delivers fuel substantially uniformly to said anode aspect
13 while said fuel cell maintains said desired shape; and

14 (E) electrical coupling disposed across said current collectors at said
15 anode aspect and said cathode aspect and having means for connection to an ap-
16 plication device being powered by said fuel cell.

1 8. (Withdrawn) The conformable fuel cell as defined in claim 7 wherein said plastic
2 frame is formed into said desired shape in an insert molding process.

1 9. (Withdrawn) The conformable fuel cell system as defined in claim 7 wherein said
2 compression applied to said active area is equal to or greater than about 100 psi.

1 10. (Withdrawn) The conformable fuel cell system as defined in claim 7 further com-
2 prising:
3 effective water management from cathode to anode such that water management
4 is achieved within the fuel cell system.

1 11. (Withdrawn) The conformable fuel cell system as defined in claim 7 wherein said
2 fuel is substantially comprised of a vapor fuel, a gel fuel, a liquid fuel and combinations
3 thereof.

1 12. (Currently Amended) The conformable fuel cell ~~system~~ as defined in ~~claim 7~~
2 claim 1 wherein said conformable fuel cell ~~system~~ is shaped to conform to one of the fol-
3 lowing:

- 4 (A) a body segment; and
5 (B) a contoured wall of an application device; and
6 (C) an exterior housing or an interior volume of an application device.

1 13. (Currently Amended) The conformable fuel cell ~~system~~ as defined in ~~claim 7~~
2 claim 1 wherein said conformable fuel cell ~~system~~ is attached to an article of clothing
3 mechanically.

1 14. (Currently Amended) The conformable fuel cell ~~system~~ as defined in ~~claim 7~~
2 claim 1 wherein fuel delivery is accomplished from a detachable conduit that connects to
3 said anode aspect of the fuel cell.

1 15. (Withdrawn) A conformable fuel cell array, comprising:

2 (A) a plurality of individual fuel cells coupled in a communicating re-
3 lationship such that the fuel cells combine to form an array that produces an overall
4 power output;

5 (B) each individual fuel cell comprising a membrane electrolyte having
6 an anode aspect and a cathode aspect, a fuel source, and current collectors that are cou-
7 pled, and which coupling is connected to the other fuel cells in said array in such a man-
8 ner that the electricity generated by each fuel cell is combined to produce said overall
9 power output for the fuel cell; and

10 (C) means for coupling each individual fuel cell together in such a
11 manner that the array of fuel cells is conformable to non-planar surfaces.

1 16. (Withdrawn) The conformable fuel cell array as defined in claim 15 wherein said
2 current collectors at each of said anode aspect and said cathode aspect apply adequate
3 compression effectively over the active area of the membrane electrolyte.

1 17. (Withdrawn) The conformable fuel cell array as defined in claim 15 wherein said
2 compression applied to said active area is equal to or greater than about 100 psi.

1 18. (Withdrawn) The conformable fuel cell array as defined in claim 15 further com-
2 prising:

3 effective water management from cathode to anode such that water management
4 is achieved within the fuel cell array.

1 19. (Withdrawn) The conformable fuel cell array as defined in claim 15 wherein fuel
2 from said fuel source is substantially comprised of at least one of the following:

3 a vapor fuel, a gel fuel, a liquid fuel and combinations thereof.

1 20. (Withdrawn) A method of imparting compression to the components of a fuel cell
2 having a catalyzed membrane electrolyte with two major surfaces, and an anode current
3 collector and a cathode current collector, the method including the steps of:

4 molding a frame of the appropriate overall shape around the edge of the array and
5 the edge of each individual cell, designed to apply such clamping power on the
6 edges of the multilayered cells to result in target compression over the active area.

1 21. (Withdrawn) The method of imparting compression to components of a fuel cell
2 as defined in claim 20 wherein said target compression is equal to or greater than about
3 100 psi.

4 22. (Withdrawn) A method of imparting compression to the components of a fuel cell
5 having a catalyzed membrane electrolyte with two major surfaces, and an anode current
6 collector and a cathode current collector, the method including the steps of:

7 pulling the anode current collector and the cathode current collector towards one
8 another generally along the two major surfaces of the fuel cell using a connection

9 element that can be placed under tension, such that compression is applied to the
10 catalyzed membrane electrolyte.

11 23. (Withdrawn) The method of imparting compression as defined in claim 22, in-
12 cluding the further step of employing as said compression element a nonconductive
13 thread.

1 24. (Withdrawn) The method of imparting compression to a fuel cell as defined in
2 claim 22, including the further step of providing a catalyzed membrane electrolyte that is
3 substantially comprised of a material that expands upon hydration such that when said
4 membrane electrolyte is hydrated, the expanded material causes further compression
5 within said fuel cell.

1 25. (Withdrawn) The method of imparting compression to a fuel cell as defined in
2 claim 22 including the further step of providing a dedicated layer of material that imparts
3 compression to the active area of the catalyzed membrane when the dedicated layer un-
4 dergoes expansion upon at least one of the following: hydration, exposure to fuel, and
5 exposure to heat.